

VII.—*On a Filtering Cistern of the Fourteenth Century at Westminster Abbey.* By
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THE way into the cloister of Westminster Abbey from the west is through what in the old days was the *parlour*, a place where the monks coming from their cloister on the east met those from outside with whom they might have business, who came from the court called *The Elms* on the west. Now, with its windows blocked up, its walls bare and weather-stained, and its carved and moulded work all decayed and broken, it seems a rather gloomy passage. But it was a light and beautiful room after the general rebuilding of the domestic part of the abbey, which Abbot Litlington completed with the legacy of his predecessor Cardinal Langham. It is in a line with the south walk of the cloister, and lies between the deanery—once the abbot's house—on the north, and the western part of the frater on the south. This end of the frater was walled off from the rest below and formed the pantry and buttery, above which was a gallery.

In the thickness of the frater wall between the buttery and the parlour is a narrow stair with a small doorway at the bottom from the parlour, and another at the top from the leads of the cloister, both of which are blocked. The plan and section of this are shown in figs. 1 and 2. I believe the place was first described in a paper on the *Abbey Buildings of Westminster*, which I wrote in 1875, and which is printed in the *Archaeological Journal*, vol. xxxiii. In that paper will be found a view of the stair with a plan and sections from drawings made by Mr. Somers Clarke, who got into it through a loop at the top of the stair.^a

^a The stone has perished much during the last fifteen years and the loop is much larger than it was. An attempt to get in that way now would probably bring the wall down.

Last summer the lower doorway was opened and so I had an opportunity to make a thorough examination of the place. Considering the difficulties under which Mr. Clarke's drawings were made they are remarkably accurate and complete, and they serve again to illustrate this paper with only some additions which a search under more favourable conditions now enables us to make.

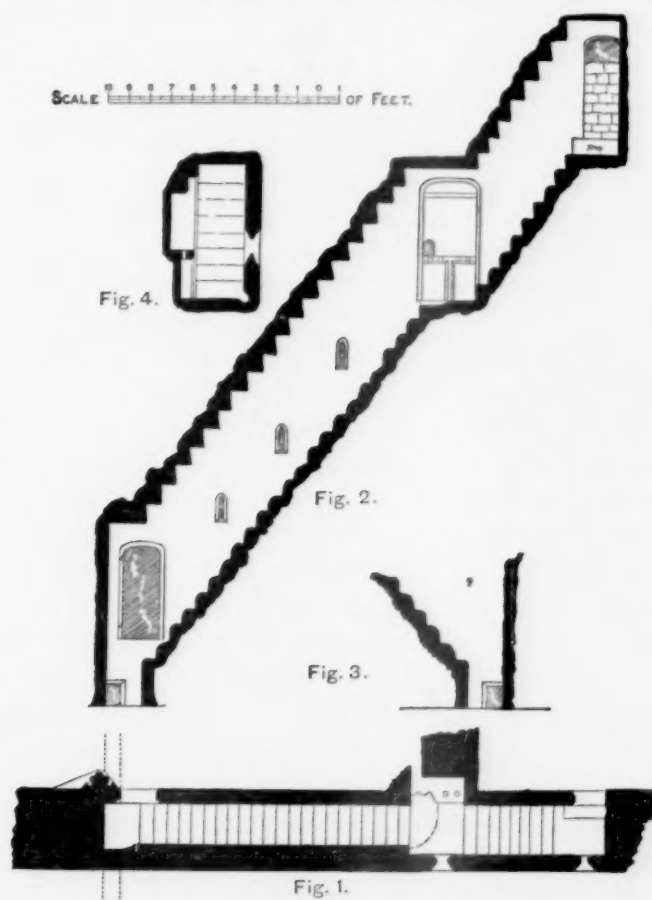
It is a strange-looking place, just the one to excite the imagination of antiquaries of the melodramatic school, and some gruesome theories have been broached as to its use. The suggestion that it might have served for the distribution of alms, which I put forth with much hesitation in my former paper, is less picturesque than some of these; but I am well satisfied that it is as wide of the mark.

The lower doorway from the parlour is only 3 feet 9 inches high and less than 2 feet wide, and its sill is raised slightly above the pavement, which itself is above the original floor level. The door was hung on the west jamb and has opened inwards directly over a shallow well or cesspool, on the north and south sides of which are the openings (about 9 inches by 12 inches) of a drain which has run through it. From the well there rises eastwards a very steep stair of twenty-one steps only 20 inches wide with three narrow loops towards the parlour, now blocked up. Then there is a landing, of which more shortly, and the stair widens a little towards the south, and is continued with nine more steps to a second landing at the top. From this landing there is a doorway to the leads of the cloister on the north, and a hole, the decayed stone round which retains just enough of its form to show that it was once a narrow loop with a trefoiled head. This looks towards the frater, and is over its door from the cloister.

It is very evident that the explanation of the place must be sought on the middle landing. There, towards the south, is the hole much broken and decayed, which I once suggested might possibly be a hatch, but a close examination shows that it was a small trefoil-shaped opening which can scarcely have served any other use than to give a little light and air from the frater. Opposite, on the north side, in the thickness of the east wall of the abbot's chapel, which there joins that of the frater, is a shallow recess something like a doorway, with a stone shelf about 2 feet 2 inches from the floor, above which the recess becomes deeper and the width of the shelf is $13\frac{1}{2}$ inches. A kind of mullion rises from the floor below the shelf, and through the shelf in each division is a pair of round holes side by side and $2\frac{1}{2}$ inches in diameter. The western half above the shelf has been blocked with rough masonry, which seems to have been put there in comparatively recent times to give support to the lintel, which is cracked through.

It is not of any use now, and the weight of it has broken off the front of the shelf on that side.^a See figs. 2 and 4.

As soon as I saw the place it seemed to me that these two pairs of holes must have been connected with the old water supply of the abbey, and I wondered



PLAN AND SECTIONS OF CONDUIT CHAMBER AT WESTMINSTER ABBEY.

that I had not thought of it before. The condition of the lower flight of steps and the presence of the drain below confirmed this opinion. But, assuming that we had here the site of an ancient conduit, it was not evident how the water got

^a The break passes through the holes and the piece broken off was found by Mr. Wright, the clerk of the works, in clearing out the cesspool at the bottom of the stair.

to it or how any but the waste got away from it. So we* sought about for an inlet and an outlet, and soon succeeded in finding both, the former behind the blocking in the west corner of the recess just above the shelf, and the latter in the end of a lead pipe near the bottom of the stair, cut off flush with the wall, through which it evidently passed towards the buttery. The place of this pipe is shown by the dot in fig. 3, which is the section of the bottom of the stair, looking south.

Thanks to the accidental preservation of a plan of the Monastery of Christchurch, Canterbury, made in the twelfth century on purpose to be a record of the positions of the various pipes and drains, we know how a great medieval abbey was supplied with water. That plan is in the library of Trinity College, Cambridge, and a copy of it was published by this Society as long ago as 1755. Its intricacies have been unravelled and the whole clearly explained by Professor Willis in his *Architectural History of the Conventual Buildings of the Monastery of Christchurch in Canterbury*.

The system is that used by the Ancient Romans, and it is pretty certain that the engineers of the waterworks of our English abbeys had Vitruvius for their text-book. The water was first collected into a reservoir or conduit-head, which might be near at hand, as it was at Rievaulx Abbey and at Canons Ashby, in both of which places these conduit-heads remain. Or it might be some distance away, as it was at Canterbury and at Westminster. From the conduit-head the water was taken through a series of settling tanks and thence by pipes to a cistern or conduit in some convenient place amongst the abbey buildings, and from it to a succession of other conduits at graduated levels. In each cistern were two standing pipes, a taller by which the water was supplied, and a shorter which regulated its level and conveyed the superfluous water to the cistern next below, to which it served as the supply pipe. And so to the next till the lowest, the overflow from which was discharged into a drain. The water was thus always moving and the waste helped to flush the drains.

Cocks and service pipes gave water for use from each cistern, and service was also taken direct from the supply pipes where that was most convenient. The highest conduit in an abbey seems generally to have been in or near the infirmary, and the most important architecturally was that in the cloister, which served the lavatory there. This was sometimes a work of much magnificence.

Water was brought to Westminster from a source in what is now Hyde Park, and the first conduit was in the middle of the infirmary cloister, where it

* Mr. John Richmond was my companion in the search.

is still represented by a fountain. The cloister lavatory opened out of the west walk of the cloister in the bay next north of the parlour. The arch that led to it may still be seen, though it is blocked up; and the chamber within it contained the cistern which served the neighbouring houses until a few years ago. The place seems to have been much altered in the sixteenth century when the abbot's house was enlarged and extended over the cloister, covering over the yard which had before given light to the north side of the parlour.^a

The cistern must have been outside the cloister wall and rather high up, for it is evident that the overflow from it served the conduit which is the subject of this paper. The parlour is vaulted, and over it is a room which I believe to have been the abbot's chapel. And the opening through which the supply pipe was brought is close against the inside of the east wall, between the vault of the parlour and the floor of the chapel, which shows clearly how and whence the water came.

The arrangement of the cistern itself is not so certain, but I venture to offer a diagram (fig. 5) showing a restoration of it as a filtering tank, which at least fits the existing evidence and accounts for what has been found. I suppose the cistern to be divided in the middle for about three-quarters of its depth and half filled up with some filtering substance,

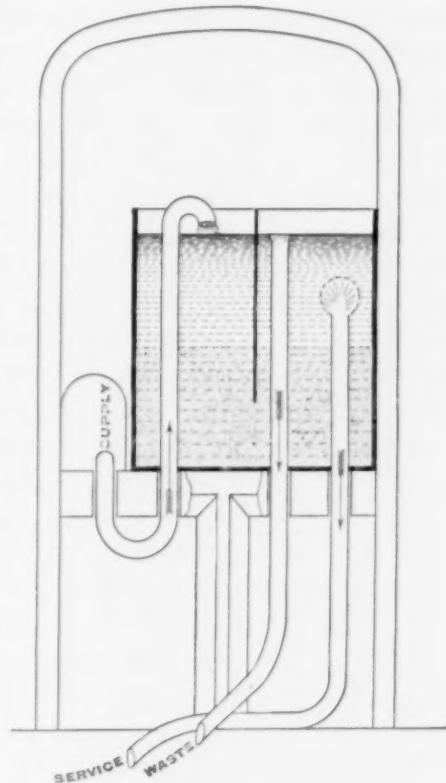


Fig. 5. SUGGESTED RESTORATION OF THE FILTERING CISTERN. ($\frac{1}{8}$ linear.)

^a This was done before the suppression of the abbey, for the king's letters patent, dated 20th January, 32 Henry VIII., which grant the late abbot's house to the newly appointed bishop of Westminster, include in the grant "quartam partem totius magni claustrum dicti nuper monasterii cum edificiis scituatis et existentibus super eadem; quaedam quarta pars contigue et proximo adjacet eidem domui mansioni et habitacioni."

The Benedictine rule seems to have been only nominally observed at Westminster in the sixteenth century; and, although the monks then had perhaps not quite advanced to the state reached in some French abbeys a little later, where each man lived in a suit of rooms of his own, receiving a pension from the common fund, yet they seem to have been not far from it; and their life

which seems to have been sand,^a so that there will be free passage for the water from one side to the other, but only through the filtering bed. The supply pipe entering the chamber from the north passes downwards through the first hole in the bench and then upwards through the second and through the first division of the cistern, at the top of which it discharges itself.^b Two standing pipes pass through the eastern pair of holes into the second division, and are respectively the waste and the service pipe.

The same arrangement of pipes might indeed have existed with an undivided cistern and no filter. But, if it were so, there seems to be no sufficient reason why this chamber, the provision of which was a matter of much contrivance and considerable cost, should have been made at all. For the two taps, which seem to have been all that it supplied, might have been served as well direct from the cloister conduit only about twenty-five feet away on the other side of the parlour.

The course of the pipes on leaving the cistern can be traced almost with certainty. It seems that the waste was at first simply discharged on the floor, and the water left to find its way down the steps to the drain at the bottom. This must soon have caused damp to show in the wall below, and a sort of gutter of lead was made, crossing the landing in a curve and going down by the south side of the stair, where a chase was cut in the wall for it.

The service-pipe seems to have followed the same course to nearly the bottom of the stair, where it turns through the wall towards the buttery. There was a draw-off on this pipe before it entered the wall, and the tap of it was found with many other things in cleaning out the cesspool. The collection is what might have been expected in such a place: fragments of pottery, some modern, thrown in through the loop-holes which were open till about fifty years ago, and some old

was more like that of secular canons or the fellows of a college than that of real Benedictine monks. I think, therefore, that the privacy of the cloister so necessary to the true monastic life may have been given up, and with it the use of the parlour, and that even before the suppression both of them had, to a great extent, become the mere passages which they are now. And so the darkening of the parlour was a matter of little importance.

^a The holes in the iron and lead objects which were found were filled with sharp sand such as could not have got into them from the drain, and I have no doubt it was part of the filtering substance with which they got mixed up when the cistern was destroyed. In Venice, which till lately depended for fresh water on collected rain-water, it used to be passed through a bed of sand before entering the cistern or "well" in which it was stored.

^b It may be objected that the passing of the pipe twice through the bench is unnecessary, as it might have been taken directly into the cistern or over the top. But the old plumber was accustomed to make his supply pipes rise up directly from the bottom of his cisterns; and, if he had been asked why he did so here, he might have answered, as his modern brother often will in like case, "That is the way it is always done."

enough to have belonged to vessels broken in fetching water from the tap; a quarry of window glass; the head of a hammer, perhaps used when the place was dismantled^a; that of another tool, like a spud; a number of other pieces of iron and some of lead; some solder, which may have been lost when the cistern was fitted up or repaired; and a piece of hard bronze of strange shape, which seems to be a "runner" from some considerable casting.^b

Many of the fragments evidently formed part of the cistern and its appurtenances, although it is only possible to find the exact places of a few of them. The cistern itself appears to have been formed of lead of about 12lbs. to the square foot, and to have been cut to pieces with an axe. The free play which the destroying axe had, as recorded by the marks on one of the fragments, shows that the lead was not fastened as a lining to a wooden cistern. It was, indeed, quite strong enough to stand by itself. There is an iron bolt of proper length to have been a tie from front to back of the cistern, which no doubt it was, and another shorter and very strong bolt, the use of which does not now appear.

The gutter into which the waste pipe emptied itself was also of strong lead, and one of the fragments seems to have been the lip by which it discharged into the cesspool. No pieces of pipe have been found, probably because it was easy to take pipes away without cutting them up.

Amongst the rest are the remains of an ornamental lock and of a key of the fifteenth century, which may have belonged to one another, and to the little door at the bottom of the stairs. There is also what may be the staple into which the bolt of the lock worked.

The tap (fig. 6) is a "half-inch full-way bibcock," and it has a rather modern look at first sight. But the barrel is so exactly like that of a tap found on the site of Kilburn Priory, and figured in our *Proceedings* (2nd. Series, xi. 260), as to suggest that they must have been cast from the same pattern. The connection between Westminster and Kilburn makes this not unlikely. The treatment of the handle of the Kilburn tap, which is made to serve also as the spout,

^a This was probably done by Guy Gasken, "servant unto the dean and chapter," who on the 5th November, 1544, received orders from them to take down the frater house. Only the roof was taken off, as the sole object was to get money, and lead and timber could be sold, but stone walls would not pay for the pulling down. Our conduit, too, must have been destroyed for the sake of the lead.

^b This has not had anything to do with the filtering cistern, and its presence in the drain was accidental. But I think the thing is ancient. It seems to be a bit of waste produced in casting by the wax process, and it may be a scrap from the workshop of Torrigiano, or of one of them to whom we owe the figures of Richard II. and his queen and Edward III. For several reasons I think it did not belong to Torel.

caused it to be dated when it was exhibited to the Society as the twelfth or early thirteenth century. Perhaps that may be too early, and the Westminster tap



Fig. 6. LATTEN WATER-TAP FOUND AT WESTMINSTER ABBEY. (Half-size.)

The tap has lost its handle, which was very likely broken off by the blow that knocked the tap out of its place and into the cesspool below, and so preserved it for us. It is open, showing that the work of destruction began by running off the water through it.



Fig. 7. LATTEN WATER-TAP FOUND ON SITE OF KILBURN PRIORY. (Half-size)

Although the evidence is not in every respect quite perfect, I think there is enough of it to justify the title I have ventured to put to this paper, and to support the conclusion that this odd-looking chamber in the wall was made and used simply to contain a filter for the drinking water used in the abbey. The cistern is small, and would hold only about six gallons of filtered water. But it would fill itself as quickly as the water could be drawn off, and there was really no limit to the supply. Of the two taps, that in the buttery would supply what was wanted for the use of the monks' table in the frater, and the other would serve the abbot's house. The door at the bottom of the stair is small because a larger was not wanted, and the small one fitted the place better. It was not intended for anyone to pass through, but only to hand in a pitcher or other vessel to receive water drawn off at the tap.

I do not regard it as a serious objection that no such arrangement as that which I have supposed has been found elsewhere. For none such has been looked for. The number of us who have studied monastic buildings is not very large, and, though we know more now than we did a few years ago, a good deal still remains to be learned, and I have hope that now the subject has been proposed further search will discover other examples. There is a little closet under the dorter stairs at Easby Abbey which I have long thought was made for a cistern,

and it would not surprise me now if it were shown to have been a filter. It would have served the guests' dining hall,^a and, like that at Westminster, received its supply from the cloister conduit.

The want of written evidence as to the use of filters in the middle ages does not prove that they were unknown, for, as we have no regular treatise on water supply of that period, any such mention could only be accidental.^b Of the ancient writers on the subject, Frontinus^c seems to make no mention of filtering. His *piscina limaria* is a settling tank; and it is very likely that settling was the only method of cleansing water used on a large scale. But Vitruvius,^d after treating of settling tanks, adds, "ea autem loca si duplicia aut triplicia fuerint, uti percolationibus aquae transmutari possint, multo salubriorem ejus usum efficient." Here the word *percolatio* seems to imply the use of some medium through which the water must pass from one tank into another; and Pliny, who was a writer thought much of by our ancestors, plainly mentions it. He, also writing of cisterns, says,^e "Utilius geminas esse ut in priore vitia consistant et per colum in proximam transeat maxime pura aqua." If *colum* might be translated *filtering bed* this passage would exactly describe the arrangement which is suggested by the remains found at Westminster.

^a It is mentioned by Mr. W. H. St. John Hope in his excellent description of the abbey buildings in the *Yorkshire Archaeological Journal*, vol. x., p. 150, and his section of the *Cellarium* passes through it.

^b Dr. Andrew Boorde, a physician who wrote in Henry VIII.'s time, advises that water for drinking be boiled as well as strained. But he did not recommend the free use of it even so. Speaking for himself he says plainly, "I can not away with water . . . wherefore I do leve al water and do take myself to good ale." Nevertheless he gives his professional opinion, part of which is this:

"Water is not holsume sole by it selfe for an Englysshe man, consyderynge the contrarye vsage, whiche is not concurraunt with nature: water is colde, slowe, and slacke of digestyon. The best water is rayne-water, so be it that it be clene and purely taken. Nexte to it is ronnyng water, the whiche doth swyftly ronne from the east in to the west upon stones or pybles. The thyerde water to be praysed is ryver or broke water, the which is clere, ronnyng on pibles and graunyl. Standynge waters, the whiche be refresshed with a fresshe spryng, is commendable; but standynge waters, and well-waters, to the which the Sonne hath no refflyxon, althoughe they be lyghter than other ronnyng waters be, yet they be not so commendable. And let euery man be ware of all waters the whiche be standynge, and be putryfyed with froth, duckemet, and mudde; for yf they bake, or brewe, or dresse meate with it, it shall ingender many infyrmytes. The water the which euery man ought to dress his meat withall, or shall use bakynge or bruyng, let it be ronnyng; and put it in vesselles that it may stande there ij or iij houres or it be occupyde; than strayne the vpper parte throughe a thyeke lynnyn cloth, and cast the inferyall parte awaye." *A Compendyous Regyment or a dyetary of Helth*, by Andrew Boorde, of Physicke Doctour, 1542. Early English Text Soc.: Reprint, p. 252.

^c *De Aquaeductibus Urbis Romae*, Art. xv. See also Art. xix.

^d *Lib. viii. cap. vi.*

^e *H. N. lib. xxxvi. cap. 52 (28).*

The following is a List of such of the objects found in the cesspool as appear to be ancient :—

OF BRONZE.

A tap, and a "runner" weighing $18\frac{3}{4}$ oz.

OF IRON.

A $\frac{3}{4}$ " bolt with a welded head diameter $1\frac{3}{4}$ ". The distance from the head to the hole through which the wedge passed is $13\frac{1}{4}$ ", which probably gives the external width of the cistern.

A $1\frac{1}{16}$ " bolt with head diameter 2". From head to hole of wedge just 6".

A piece of inch round iron 8" long.

Two hooks : one 8" by 3", bent at right angles, the long end spiked as for driving into the wall ; the other 9" by 3", not spiked, with the turned-up part formed like a leaf.

A strong square nail $6\frac{1}{4}$ " long with a clout head ; and a slender nail $4\frac{1}{4}$ " long.

A slender rod $10\frac{1}{4}$ " long, which seems to have had a hook at the end.

A $\frac{1}{4}$ -inch round rod 11" long, bent to the shape of an S., probably a pot hook.

One plate, two "buttresses," and a bolt, probably parts of the lock of the lower door.

A staple and key, probably belonging to the same.

The head of a hammer ; the head of a "spud" ; and a spur and an iron spike of doubtful antiquity.

OF LEAD AND SOLDER.

Two pieces which seem to have formed part of the cistern, one showing marks of the axe used in cutting it up.

Three pieces which seem to have belonged to the gutter. One apparently the lip at the bottom. The other two pierced by iron nails.

A piece of solder, cast like a grate, and three lumps of lead from the melting pan.

OF POTTERY.

Three fragments of a bowl 10" in diameter with green glaze inside ; one smaller fragment of similar ware ; a piece of the lip of a vessel of red ware glazed inside ; and five paving tiles.

OF GLASS.

A fragment of window glass with the hand and branch, the rebus of Abbot Islyp, and part of his name.